

AMENDMENT NO. 1 MAY 2021

TO

IS 3976 : 2018 SAFETY RUBBER CANVAS BOOTS FOR MINERS — SPECIFICATION

(*Sixth Revision*)

(*First cover page*) — Substitute ‘Safety Boots for miners’ *for* ‘Safety Rubber Canvas Boots for Miners’

(*First cover page*) — Substitute ‘खनिकों के लिए सुरक्षा जूते’ *for* ‘खनिकों के लिए कैनवस सुरक्षा जूते’

(*Second cover page, Foreword, Para 2 and Para 3*) — Substitute ‘Safety Boots for miners’ *for* ‘Safety Rubber Canvas Boots for Miners’

(*Page 1, English Subtitle*) — Substitute ‘Safety Boots for miners’ *for* ‘Safety Rubber Canvas Boots for Miners’

(*Page 1, clause 1*) — Substitute the following for the existing:

‘This standard prescribes requirements and method of sampling and test for safety boots with metallic toe cap for protection of miners.’

(*Page 1, clause 3.1, 3.3, 3.4 and 3.7*) — Deleted.

(*Page 2, clause 5.2 and its sub clauses*) — Delete clause 5.2 and its sub clauses and Substitute the following for the existing:

‘5.2 Material

5.2.1 Upper

Upper material shall be rot-proof and made of a single layer of suitable textile (recommended to be a blend of cotton and synthetic with minimum GSM 450) for

Price Group 3

Type II and two layers of suitable textiles (both layers recommended to be blends of cotton and synthetic) adhered together for TYPE- I. The upper material shall also conform to the following requirements:

5.2.1.1 If the upper material is composed of two layers of textiles adhered together, the upper material shall comply with the consolidation test as per **5.10** of this standard.

5.2.1.2 If the upper material is composed of two layers of textiles adhered together, the upper material shall develop no cracks before 150 000 cycles when tested in accordance with **6.5.2** of IS 15298 (Part 1).

5.2.1.3 When tested in accordance with **6.3** of IS 15298 (Part 1), the upper material shall comply with tear strength as per **5.4.3** of IS 15298 (Part 2).

5.2.1.4 For Type 2 footwear (for use in dry conditions of mining), the upper material shall comply with requirements of water vapour permeability and coefficient as prescribed in **5.4.6** of IS 15298 (Part 2), when tested in accordance with **6.6** and **6.8** of IS 15298 (Part 1).

5.2.1.5 When inner surface of upper material is tested in accordance with **6.12** of IS 15298 (Part 1), the surface shall not develop any holes before the following number of cycles has been performed:

Dry – 25 600 cycles

Wet – 12 800 cycles

5.2.2 *Insole and Lining of Insocks and Counter Stiffener*

Insole and lining of insocks and counter stiffener shall be made of textile material.

5.2.2.1 *Abrasion Resistance*

When insole and lining of insocks and counter stiffener is tested in accordance with **6.12** of IS 15298 (Part 1), it shall not develop any holes before the following number of cycles has been performed:

Dry – 25 600 cycles

Wet – 12 800 cycles.

5.2.3 *Binding Material* — Binding materials shall conform to the requirements given in col 3 of Table 1 when tested according to the methods prescribed in col 4 of Table 1.

5.2.3.1 In case of cotton black binding material, the same shall be free from sulphur dyes when tested in accordance with Annex B.

Table 1 Requirements for Binding Material

(Clause 5.2.3)

Sl No.	Characteristics	Requirements	Methods of Test, Ref. to IS
(1)	(2)	(3)	(4)
i)	Width in mm, <i>Min</i>	13	1954
ii)	Breaking load in N, <i>Min</i> (50 cm grip length test specimen)	360	Annex C

5.2.4 Reinforcing Material

Quarter at the back of the upper heel region shall have reinforcement with minimum 25 mm wide strip made out of upper as specified in 5.2.1 or any other material having similar tear strength as prescribed in 5.2.1.3, as agreed to between the purchaser and manufacturer. Reinforcing material of similar tear strength may also be provided at specific portions of upper, to meet desired performance requirement of purchaser, if agreed to between the manufacturer and purchaser.

5.2.5 Compact Sole

5.2.5.1 The design of polymeric / rubber compact sole shall be as agreed to between the purchaser and the manufacturer. The sole may comprise of several layers. The compact sole shall be made out of polymeric / rubber components and the typical design recommendation (not mandatory) of compact sole is given in Fig. 3. Sectional view of Type 1 / Type 2 toe position is given in Fig. 4.

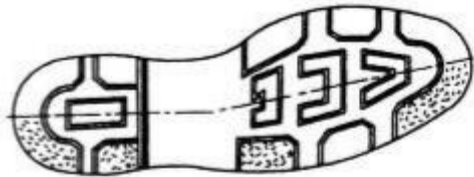


FIG. 3 DESIGN OF SOLE

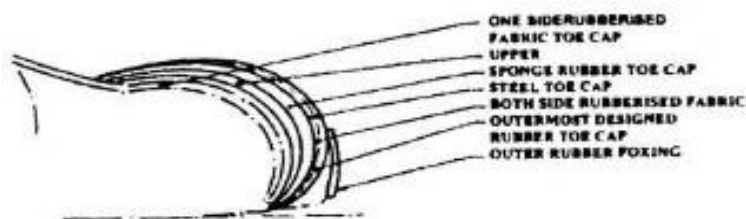


FIG. 4 TOE POSITION, SECTIONAL VIEW

5.2.5.2 The components of compact sole shall conform to requirements prescribed in col 3 of Table 2, when tested as per corresponding test methods prescribed in col 4 of Table 2. Ageing test is carried out for rubber components only.

Table 2 Physical Requirements for Compact Sole
(Clause 5.2.5.2)

Sl No.	Characteristics	Requirement	Method of Test, Ref. to IS
(1)	(2)	(3)	(4)
i)	Hardness (IRHD)	68 ± 5	3400 (Part 2)
ii)	Change in hardness after accelerated ageing at 100 ± 2 °C for 24 h (for rubber components)	+5 -2	3400 (Part 4)

5.2.5.3 Thickness of compact sole — When tested in accordance with **8.1.2** of IS 15298 (Part 1), the thickness of compact sole of the boots shall comply with the values prescribed in Table 3 [see Fig. 39 of IS 15298 (Part 1)].

Table 3 Requirement of Polymeric / Rubber Compact Sole Heel
(Clause 5.2.5.3)

Sl No.	Component	Thickness, <i>Min., mm</i>
(1)	(2)	(3)
i)	Compact Sole:	
	a) Fore part	
	d_1	4
	d_2	6
	b) Heel	
	d_1	6
	d_2	9

5.2.5.4 Abrasion resistance

When outsole is tested in accordance with **8.3** of IS 15298 (Part 1), the relative volume loss shall not be greater than 150 mm³.

5.2.5.5 Flexing resistance

When outsole is tested in accordance with **8.4** of IS 15298 (Part 1), the cut growth shall not be greater than 4 mm before 30,000 cycles.

Spontaneous cracks are acceptable in the following circumstances.

- a) Only the centre of the tread area shall be assessed for cracking, that is, cracks under the toecap zone shall be ignored.
- b) Superficial cracks up to 0.5 mm deep shall be ignored.
- c) Soles shall be deemed to be satisfactory if cracks are not deeper than 1.5 mm, not longer than 4 mm and not more than five in number.

5.2.5.6 Tear strength

When outsoles are tested in accordance with **8.2** of IS 15298 (Part 1), the tear strength shall not be less than 8 kN/m.

5.2.5.7 Resistance to hot contact

When outsole is tested in accordance with 8.7 of IS 15298 (Part 1), the material shall not melt/deform and shall not develop any cracks when bent around the mandrel.

5.2.5.8 Hydrolysis

When compact sole is made out of Polyurethane, the same shall be tested in accordance with 8.5 of IS 15298 (Part 1) and the same shall comply with 5.8.5 of IS 15298 (Part 2).

5.2.6 Ageing for Whole Footwear

When rubber is used in the footwear, the finished boots shall be aged at 100 ± 2 °C for 24 h. On completion of test, the rubber components shall not develop any sign of tackiness or brittleness.

5.2.7 Thread for Upper Closing

The length (m/kg) and construction of sewing thread shall conform to requirements as prescribed in Table 4. Color of thread will be as agreed to between the manufacturer and the purchaser. In case of black cotton thread, the same shall be free from sulphur dyes when tested in accordance with Annex B.

Table 4 Requirement of Sewing Thread
(Clause 5.2.7)

Sl No.	Components	Material	Minimum Length (m/kg)	Method of Test, Ref. to IS
(1)	(2)	(3)	(4)	(5)
i)	Sewing thread for body	Sewing polyester thread variety no.9 (145 dtex × 6) Ticket Number 35	12 100	9543
ii)	Sewing thread for piping/binding	Sewing polyester thread variety no.5 (145 dtex × 3) Ticket Number 70	21 000	9543

NOTE — Any other thread as agreed to between the purchaser and the manufacturer may also be used, however the length (m/kg) should not exceed the values specified above.

5.2.8 Safety Toe Cap

Safety toe cap conforming to IS 5852 (Part 1) shall be fitted into the footwear and must not come out while in use.

5.2.9 Laces

5.2.9.1 The boots shall be provided with laces having minimum length of 115 cm for Type 1 and minimum 100 cm for Type 2.

5.2.9.2 Minimum breaking load of 60 kg is to be achieved when tested between 18 cm grip length in accordance with Annex C.

5.2.9.3 In case of cotton lace of black colour, the same shall be free from sulphur dyes when tested in accordance with Annex B. Two ends of the laces shall be provided with plastic tips.

5.2.9.4 Colour of the lace shall be as agreed to between the purchaser and the manufacturer.

5.2.10 Eyelets

Aluminum eyelets of external collar diameter not less than 10 mm and wall thickness of 0.30 to 0.35 mm shall be used.

5.2.11 Counter Stiffener

A counter stiffener, made out of textile reinforced with polymer / rubber including (thermoplastic) having minimum thickness 1.5 mm is to be stitched at inside of upper so as to fortify the back of the footwear at joints of quarter.

(Page 4, clause **5.3.1**) — Substitute the following for the existing:

5.3.1 This is an unlined footwear. Stitch used in the upper shall be 23 stitches minimum per dm (average of 3 measurements). For Type 1 boot, 8 pairs of eyelets shall be fitted to the upper, and for Type 2 boot, 5 pair of eyelets shall be fitted to the upper. However, the number of eyelet pairs may also be decided by agreement between the purchaser and manufacturer.

(Page 4, clause 5.3.5) — Substitute the following for the existing:

5.3.5 The toe cap shall be provided with an outer cover, made of polymer / rubber, which shall strongly adhere such that it shall not open up or come out while in use. Toe of the boot shall be reinforced with safety toe cap. Suitable reinforcement is to be provided between face of upper and safety toe cap as agreed to between the manufacturer and purchaser.

(Page 5, clause 5.3.7) — Substitute the following for the existing :

5.3.7 The insocks shall be made of moulded polymer / rubber / elastomer having density less than or equal to 0.9 g/cm³, with a suitable textile lining (*see 5.2.2*). One pair of detachable in socks, having minimum thickness of 2 mm, shall be provided with each pair of shoe. Providing extra pairs of insocks may be agreed to between the buyer and the seller.

(Page 5, clause 5.7) — Substitute the following for the existing:

5.7 Impact Test

When footwear is tested in accordance with the method described in 5.4 of IS 15298 (Part 1), at an impact energy of (200 ± 4) J, the clearance under the toecap at the moment of impact shall be in accordance with Table 5. In addition, the toecap shall not develop any cracks which go through the material, that is, through which light can be seen.

Table 5 Minimum Clearance under Toecaps at Impact

(Clause 5.7)

<i>Sizes of Footwear</i>		
<i>French Size</i>	<i>UK Size</i>	<i>Minimum Clearance (in mm)</i>
36 and below	Upto 3½	12.5
37 and 38	4 to 5	13.0
39 and 40	5½ to 6½	13.5
41 and 42	7 to 8	14.0
43 and 44	8½ to 10	14.5
45 and above	10½ and above	15.0

(Page 5, clause **5.10**) — Substitute the following for the existing:

Consolidation test for upper shall be carried out in accordance with IS 3400 (Part 5) on two specimens. There shall be no separation of plies at a load of 1.5 kg.

(Page 5, clause **5.11**) — Substitute the following for the existing:

When boots are tested in accordance with **5.5** of IS 15298 (Part 1), the clearance under the toe cap at a compression load of $15 \text{ kN} \pm 0.1 \text{ kN}$ shall be in accordance with Table 5.

(Page 5, clause **5.12**) — Substitute the following for the existing:

5.12 Slip Resistance Test

The footwear shall comply with the requirement given in **5.3.5.2** of IS 15298 (Part 2) when tested in accordance with **5.11** of IS 15298 (Part 1).

(Page 5, clause **5.13**) Add ‘To attain such result bidensity/bihardness compound may be used.’

(Page 5, clause **6**) — Deleted.

(Page 6, clause **7.2**) — Deleted.

(Page 6, Table **6**) — Deleted.

(Page 6, clause **8**) — Substitute the following for the existing:

The footwear shall meet the chemical requirements as prescribed in Table 1 of IS 17011.

(Page 6, clause **9**) Substitute the following for the existing:

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

(Page 6, *clause 11*) — Substitute the following for the existing:

Packing of the finished footwear will be as agreed between the purchaser and the manufacturer. Each pack having a pair of boot shall be supplied with following information in English and any other language:

- a) Name and full address of manufacturer;
- b) Details of customer care service provider;
- c) Area of application of the boot and limitation of use;
- d) Instruction for storage and maintenance; and
- e) Drying procedure of wet boots and cleaning of boots for proper service.

(Page 8, **Annex C**, *clause C-0*) — Substitute the following for the existing :

Breaking force and extension at break of binding material and/or laces can be tested in the dry state and in the wet state. The material is extended until it breaks using a tensile testing machine.

(Page 8, **Annex C**, *clause C-1*) — Substitute the following for the existing:
The machine given in Fig. 5 is used for measurement of breaking load.

Prepare three specimens of length sufficient to enable satisfactory clamping in the jaws while leaving a test length, as specified in Table 1 and **5.2.9.2**, between them. After conditioning the specimens at 27 ± 2 °C and 65 ± 5 percent RH for 24 h, extend each specimen using the tensile testing machine with jaws separating at a rate of 100 mm/min until the test sample breaks. Record the force obtained in Newton, and the extension at break if required. The arithmetic mean of three results is reported.